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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/522,051	IMELAINEN, KEIJO	
	Examiner	**Art Unit**	
	DENNIS CORDRAY	1791	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 22 May 2008.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-4,6-9 and 13-43 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-4,6-9 and 13-43 is/are rejected.

7)☒ Claim(s) 21 is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 5/28/2008 has been entered.

Response to Arguments

The outstanding rejection of Claims 1-31 under 35 U.S.C. 112, first paragraph have been withdrawn. The Examiner believes that, to burn fuel gas during operation of the soda recovery boiler, the gas would necessarily need to be supplied and burned substantially continuously for at least some period of time.

Applicant's arguments filed 5/28/2008 with regard to the rejection of Claim 19 under 35 U.S.C. 112, second paragraph have been fully considered and are persuasive. The rejection has been withdrawn.

Applicant’s amendments have overcome the rejection of Claim 16 under 35 U.S.C. 103(a) over Saviharju et al in view of Kuusio et al and Rundstrom as evidenced by Shaw et al and Tomlinson II. None of the references teaches using warm water as energy in drying the bark. Therefore the rejection of Claim 16 is withdrawn.

The rejections of Claims 5 and 10-12 are withdrawn as these claims have been cancelled.

Applicant's arguments regarding the remaining rejections are not persuasive.

Arguing the deficiencies in each individual reference where the rejections are based on combinations of references has been discussed previously.

Regarding Saviharju et al, the Examiner agrees that the reference does not teach all of the features of the claimed invention. The elimination of a separate bark boiler is not claimed in the instant invention.

Regarding Kuusio, any burning of the gasified fuel, whether as a starting fuel or otherwise, involves continuous burning of the fuel for at least some finite period of time. A bark boiler is not precluded by the instant claims and would obviously not be needed with the combination of references as discussed herein.

Rundstrom was used to teach features of a wood gasifier for continuously converting wood waste material into relatively tar free fuel gas without release of large quantities of air pollutants, not supplying fuel to a soda recovery boiler.

Shaw et al and Tomlinson II were used to demonstrate that it is known in the art to use auxiliary fuel such as gas as startup fuel and to maintain temperature throughout the furnace in recovery boilers. One of ordinary skill in the art would have found it obvious to use combustible gas from any available source as the auxiliary fuel. Using an auxiliary fuel would obviously involve burning that fuel continuously for some period of time. Tomlinson II only teaches against using fuels like powdered coal to avoid contaminating the pellets that will form the make-up chemical for the pulp mill (col 5, lines 60-67). Tomlinson II also teaches ligno-cellulosic fuel as particularly suitable as an auxiliary fuel because it distributes itself throughout the bed (col 5, line 67 to col 6, line

4). However, Tomlinson II further teaches using gas as an auxiliary fuel along with adjusting air supply to maintain satisfactory operating temperature throughout the furnace (col 6, lines 10-15). Thus, Tomlinson II does not teach against using gas as an auxiliary fuel.

The Examiner believes that the combination of the teachings from the above references makes the claimed invention obvious to one of ordinary skill in the art at the time of the invention as discussed in detail herein.

The remaining rejections not indicated herein as withdrawn are maintained, but have been rewritten for clarification and to address the amended claims.

In addition, new grounds of rejection are presented as detailed below.

Claim Objections

Claim 21 is objected to because of the following informalities: in lines 3 and 5, the word “drier” should be changed to “dryer”. Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1 and 9 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contain subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claims 1 and 9 recite that at least part of the bark is gasified. The instant Specification recites that the bark, waste wood, bark residue or corresponding solid waste is dried and gasified (p 5, par 16; p 10, pars 36, 37; p 18, par 65; Claims 1, 2). While the phrase "at least part" of the bark is gasified includes all of the bark, the Specification does not recite that only part of the bark is gasified, thus the amended claims recite limitations not embodied by the original Specification.

Claims 1 and 9 recite that "essentially the entire bark amount" is dried. Claim 34 recites that "essentially the entire bark amount" is gasified. The Specification does not use or define the word "essentially." Since the term implies that less than all of the bark can be dried and gasified, the amended claims recite limitations not embodied by the original Specification for reasons given above.

Claims 33 recites that the exit fuel gases from the drying of the bark are combined with the flue gases from the soda recovery boiler. There is no recitation of such a combination of fuel gases and flue gases in the Specification as filed. Moreover, there is no reason or indication given in the Specification that would teach one of ordinary skill in the art to combine the two very different gases.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-4, 6-9 and 13-43 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1 and 9 recite that “essentially the entire bark amount” is dried. Claim 34 recites that “essentially the entire bark amount” is gasified. The Specification does not contain or define the word “essentially” and the term is subjective, thus the limits attributed by Applicants to the term are indefinite.

Claim 1 recites that at least part of the biogenic fuel used is bark. Bark is not used as the fuel, but the fuel gas product of the dried and gasified bark is used. The claim is thus indefinite for failing to particularly point out and distinctly claim the subject matter which the applicant regards as his invention.

Claims 1, 9 and 19 recite feeding or burning a gas “substantially continuously during the operation of the boiler.” The Specification does not contain or define the word “substantially” and the term is subjective, thus the limits attributed by Applicants to the term are indefinite. For instance, is the gas fed or burned continuously during the entire period of operation of the boiler; or continuously during a startup or temperature adjustment of the boiler; or intermittently during the operation of the boiler such that there is “substantially” a continuous amount of gas supplied and burned; or is some other meaning intended for “substantially continuously.”

Claim 2 recites that 40% of the gas thus produced is fed into the soda recovery boiler. It is not clear whether the “the gas thus produced” is from the gasified bark, the flue gases obtained from burning or a combination of the two sources.

Claim 6 recites using gases substantially having a temperature below 200 °C for drying the bark. Claim 7 recites using steam or flue gas. Claim 8 recites using steam in a particular pressure range used as energy. Claim 32 recites using flue gas. Claim 37

recites using warm water. Claims 6-8, 32 and 37 depend from Claim 1, which recites using waste heat of the pulp mill for drying. Gases, steam, flue gas and warm water are materials, not energy or waste heat. Are the claimed materials used in addition to waste heat?

Claim 7 recites "where there is used steam or flue gas." Claim 7 depends from Claim 6 and it is not clear if the steam and flue gas are intended to be species of the gases having a temperature below 200 °C or whether steam or flue gas is used in addition to the gases having a temperature below 200 °C.

Claims 15, 30, 31 and 41 recite using steam in a particular pressure range as energy for drying the bark. Claim 16 recites using warm water as energy. Claims 32 and 38 recite using flue gas for drying the bark. Claim 41 recites using steam. Claims 15, 16, 30-32 and 41 depend from Claim 9, which recites using waste heat of the pulp mill for drying the bark. Gases, steam, flue gas and warm water are materials, not energy or waste heat. Are the claimed materials used in addition to waste heat?

Claim 17 recites “wherein a combustion chamber is in the direction of the flow of flue gases divided into two parts, in the first part of which...” The meaning of the limitation is not clear. How is a combustion chamber in the direction of flow of flue gases? Flue gases are generated by the combustion process, presumably in a combustion chamber. Is there a second combustion chamber after the generation of the flue gases?” Are the flue gases divided into two parts or is the combustion chamber divided into two parts?

Claim 19 recites “to feed into the boiler the fuel gas produced from the dried bark by gasification substantially continuously.“ Is the fuel gas fed into the boiler substantially continuously? Or is the fuel gas produced from gasification substantially continuously?

Claim 19 recites “outlet means for fuel gas” and later recites “the gas outlet means.” It is not clear if the gas outlet means is the same as the outlet means for fuel gas.

Claim 43 recites using warm water for drying the bark. Claims 43 depends from Claim 19, which recites using waste heat of the pulp mill for drying the bark. Warm water is a material, not waste heat. Are the claimed materials used in addition to waste heat?

Claim 27 recites the limitation "the outlet means of the gasifier." Claim 27 depends from Claim 19 and it is not clear if the outlet means is intended to be the outlet means for fuel gas or the gas outlet means. It is also not clear how the outlet means is connected to the recovery boiler (recited in Claim 19) and connected to a gas purification unit. Is there is an outlet means connected to a gas purification unit and a separate outlet means connected to the recovery boiler? Does the gas purification unit also have an outlet means that is connected to the recovery boiler?

Claim 29 recites “that the “solid fuel to be brought into a gaseous form is dried before the gasification to a moisture content of 10 to 15%.” Is the fuel brought to a moisture content of 10 to 15% before gasification, or does the gasification result in the fuel being brought to a moisture content of 10 to 15%?

Claim 8 recites the limitation "the energy" in 1. Claim 28 also recites “the energy.” There is insufficient antecedent basis for this limitation in the claims.

Claim 9 recites the limitation "the gas" in the second and fourth lines from the end, apparently in reference to an earlier portion of the claim. There is insufficient antecedent basis for this limitation in the claim.

Claim 14 recites the limitation "the heat recovery" in Claim 9. There is insufficient antecedent basis for this limitation in the claim as Claim 9 recites that the boiler is equipped with heat recovery, not a step of heat recovery.

Claims 14, 29 and 30 recite the limitation "the solid fuel" in Claim 9. Claim 31 recites the limitation "the solid fuel" in Claim 30. There is insufficient antecedent basis for this limitation in the claims.

Claim 17 recites the limitation "the fuel that has been rendered gaseous" in Claim 9. There is insufficient antecedent basis for this limitation in the claim.

Claim 19 recites the limitation "the gas outlet means" in an earlier portion of the claim. There is insufficient antecedent basis for this limitation in the claim.

Claim 20 recites the limitation "the outlet means of the dryer subsequent in the series" in Claim 19. There is insufficient antecedent basis for this limitation in the claim.

Claim 21 recites the limitation "the bark obtained from the first dryer" in Claim 20. There is insufficient antecedent basis for this limitation in the claim.

Claim 21 recites the limitations "the outlet means of the first drier" and “the feed means of the second dryer” in Claim 20. There is insufficient antecedent basis for these limitations in the claim.

Claim 27 recites the limitation "the outlet means of the gasifier" in Claim 19. There is insufficient antecedent basis for this limitation in the claim.

Claim 29 recites the limitation "the gasification" in Claim 9. There is insufficient antecedent basis for this limitation in the claim.

Claim 33 recites the limitation "the exit fuel gases" in Claim 32. There is insufficient antecedent basis for this limitation in the claim.

Claims 35 and 36 recite the limitation "the bark gas" in Claim 1. There is insufficient antecedent basis for this limitation in the claims.

Claim 42 recites the limitation "the bark gas" in Claim 9. There is insufficient antecedent basis for this limitation in the claim.

Claim 39 recites the limitation "the exit gases" in Claim 38. There is insufficient antecedent basis for this limitation in the claim.

The remaining claims not specifically rejected above depend from and thus carry the indefiniteness of independent claims 1, 9 or 19.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-4, 9, 13, 14, 17, 18, 32-36, 38-40 and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saviharju et al (2004/0011484) in view of Kuusio et

al (WO 93/11297) and Rundstrom (5226927) and further in view of Shaw et al (3607117) and Tomlinson II (4312702).

Claims 1, 3, 9, 13, 34 and 40: Saviharju et al teach that, in chemical pulp mills, wood bark is removed from logs (debarking process), the wood logs are cut into chips and chemically processed (cooked or digested) to separate the fibers. The cooking chemicals are recovered from the waste alkaline cooking liquor, or black liquor, by firing the black liquor in a recovery boiler. Energy released in the recovery boiler is recovered as pressurized or superheated steam and used to produce electric power and low-pressure steam for other mill heating needs (p 1, pars 2 and 4). Saviharju et al also teaches that gasification of wood and bark in fluidized bed gasifiers has been in commercial use since 1983 in pulp mills for producing combustible gas for use on lime reburning kilns (p 1, par 7).

Saviharju et al discloses a modified process for producing energy at a pulp mill comprising (Abs; p 1, par 9):

- burning black liquor (cellulose pulp digestion liquor) from kraft pulping (i.e.-a sulfate pulp mill) in a recovery boiler and
- recovering heat from the flue gases produced in the form of saturated and partially superheated steam,
- gasifying wood bark or wood wastes to generate a combustible gas (fuel gas),
- burning at least part of the combustible gas in a superheating boiler superheat the saturated and partially superheated steam in the superheating boiler.

In some embodiments, a combustible gas fuel is produced by gasifying bark, then purified in a purification unit by removing the alkali components (ash) (p 1, par 10; pp 2-3, par 23). Saviharju et al discloses that the bark is dried before gasification to produce more combustible components (p 2, pars 20 and 21). All or some of the bark produced in the pulp mill can be used (p 2, par 16).

Saviharju et al does not specifically recite digesting the wood material in a cooking liquor to separate the fibers, extracting the digested material as black liquor, or recovering the cooking chemicals from a soda recovery boiler, but the processes are taught as typical processes in a chemical pulp mill (p 1, par 2) and would have been obvious to one of ordinary skill in the art. Saviharju et al also does not disclose that the bark is produced in a debarking process at the mill; however, obtaining bark from a debarking process at the mill would have been obvious to one of ordinary skill in the art as a convenient and inexpensive source of bark that needs to be disposed of.

Saviharju et al does not disclose that the black liquor is concentrated by evaporation prior to being burned, that bark is dried to a moisture content below 30% prior to gasification, or that the combustible gas obtained from the bark is burned in the recovery boiler.

Kuusio et al disclose a method of recovering energy from waste liquors from pulp processes by burning the waste liquor in a soda recovery boiler, recovering chemicals and recovering energy in the form of superheated steam (Abs; p 1, lines 6-12; p 5, lines 19-26; p 8, lines 32-35). Energy is also recovered as electrical energy (p 13, lines 33-35). The waste liquor is concentrated by evaporation to a dry solids content of about

80% (moisture content about 20%) before being sprayed into the recovery boiler (p 12, lines 29-34). A portion of the waste liquor is gasified to produce gas as a replacement for fossil fuels to supply a separate superheating boiler for superheating the steam produced in the recovery boiler (p 6, lines 1-22). Waste liquor is concentrated prior to gasification to a dry solids content of up to 85% (15% moisture) to create a relatively good fuel and improve the energy economy of the gasifier and the soda recovery boiler (p 7, lines 15-31). The produced gas is conveyed through a purification unit and, after purification, can be used as starting fuel in the recovery boiler to replace purchased fuel, as fuel in a lime mud reburning kiln (p 10, line 37 to p 11, line 1; p 13, lines 19-24).

Rundstrom discloses a wood gasifier for continuously converting wood waste into relatively tar free fuel gas without release of large quantities of air pollutants (Abs; col 2, lines 36-48). Drying the waste material to < 20% moisture content is preferable for continuous operation (col 8, lines 43-49). Grinding the wood pieces to sizes between about ½” to 8” is preferable for continuous operation (col 8, lines 25-30).

Saviharju et al, Kuusio et al and Rundstrom do not explicitly disclose continuously supplying or burning the fuel gas in the recovery boiler.

Shaw et al teaches that, under normal conditions, auxiliary fuel (gas is mentioned) is supplied when the boiler is started up to initiate combustion of the black liquor, then subsequently shut off leaving the black liquor as the only fuel supplied to the boiler (col 3, lines 42-50). Shaw et al also teaches that auxiliary gas is supplied during operation of the recovery boiler to increase the production of steam to meet steam demands exceeding that produced by combustion of black liquor alone (col 3, lines 54-

60). As a starting fuel or an auxiliary gas to increase the production of steam in the recovery boiler, a fuel gas would be fed and burned continuously during boiler operation for the period of fuel gas usage or, at least, continuous feeding and burning would have been obvious to one of ordinary skill in the art.

Tomlinson II teaches that auxiliary fuel, such as oil or gas, is used to maintain operating temperatures throughout the furnace in recovery boilers over a considerable range of production rates (col 6, lines 10-16), thus a fuel gas is supplied and burned continuously during the period of fuel gas usage and during boiler operation.

The art of Saviharju et al, Kuusio et al, Rundstrom, Shaw et al, Tomlinson II and the instant invention is analogous as pertaining to treatment of waste liquor and waste wood material and bark in a pulp mill. The use of auxiliary fuels is known in recovery boilers, both during startup and during continuous operation. Kuusio et al, Shaw et al and Tomlinson II teach the usage of auxiliary fuel gas in the waste liquor recovery boiler. Kuusio et al teach fuel gas obtained from gasified waste material (waste liquor) used as a starting fuel in the waste liquor recovery boiler and for other fuel gas needs in the mill. Saviharju et al teaches gasification of waste bark to provide auxiliary fuel gas for various fuel gas needs in the mill. It would have been obvious to one of ordinary skill in the art to use a portion of the gas generated by gasification of wood bark for any apparatus requiring auxiliary fuel, including the recovery boiler, in the process of Saviharju et al in view of Kuusio et al and Rundstrom and further in view of Shaw et al and Tomlinsion II to save on the cost of purchased fossil fuel and minimize waste bark disposal. One of ordinary skill in the art would have been able to determine the periods

of need for auxiliary fuel in the recovery boiler and to supply and burn the fuel substantially continuously during those periods at startup, to meet steam generation demands and to maintain temperature control in the furnace. It would further have been obvious to concentrate the black liquor and the wood bark to the claimed moisture content to provide fuel and improve energy economy for the recovery boiler and other heating equipment.

Claims 2, 36 and 42: of Saviharju et al, Kuusio et al and Rundstrom do not disclose the amount of generated gas used in the recovery boiler. However, the amount of fuel gas used in a combustion process is a result effective variable and it would have been within the capability of one of ordinary skill in the art to optimize the percentages of the fuel gas required for operation of the recovery boiler, superheater and lime reburning kiln or, alternatively, to use all of the gasified fuel gas if required in the recovery boiler.

Claims 4 and 17: Saviharju et al disclose that a portion of the generated gas is used to superheat soda recovery boiler steam in a superheating boiler that is separate from the recovery boiler (superheating chamber separate from the flue gases of the soda recovery boiler) (p 1, par 9; p 3, par 18; Fig. 1, items 14 and 18). Figure 1 of Saviharju et al shows schematically (p 2, pars 18-22) a combination soda recovery boiler and steam superheating unit divided, in the upper portion thereof in the direction of flow of the flue gases, into two chambers, the right hand chamber (15) for burning concentrated waste liquor, vaporizing boiler waters and heating the steam therefrom (via surfaces 34, 36 and 40), and the left hand chamber separated from the flue gases

of the right chamber (18) for superheating the steam. Gasified fuel is burned in the superheating chamber by burner (56). As discussed above, it would also have been obvious to also burn fuel from the gasifier in the recovery boiler (right hand chamber).

Claims 14: Saviharju et al disclose that the wood material can be dried by flue gases from the recovery boiler (p 2, par 20). While not explicitly disclosed, bringing the flue gas into direct contact with the waste wood would have been obvious to one of ordinary skill in the art as an efficient drying method.

Claims 18 and 35: Saviharju et al disclose that a portion of the combustible gas can be used to fuel a lime kiln to replace fossil fuels (p 2, pars 12 and 21).

Claims 32 and 38: Saviharju et al disclose that the bark can be dried using flue gases from the recovery boiler or the lime burning kiln (p 2, par 20).

Claims 33 and 39: Saviharju et al do not explicitly disclose that flue gases, after being used to dry the bark, are recombined with the flue gases from the soda recovery boiler. However, it would have also been obvious to one of ordinary skill in the art to recombine gas from the drying of the bark with that from the soda recovery boiler to simultaneously recover the remaining energy therefrom in a single unit rather than requiring a separate heat recovery unit.

Claims 6-8, 14-15, 19-31 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saviharju et al in view of Kuusio et al and Rundstrom and further in

view of Shaw et al and Tomlinsion II, as applied to Claims 1-4, 9, 13, 14, 17, 18, 32-36, 38-40 and 42 above, and even further in view of O'Hagan et al (4627173).

Saviharju et al, Kuusio et al, Rundstrom, Shaw et al and Tomlinsion II do not disclose the configuration of the dryer, its connection to the gasifier, the temperatures of the gases used in the dryer, the use of steam or warm water, or connecting the outlet of the gasifier to the recovery boiler.

Saviharju et al disclose that dried wood fuel, such as bark, from the mill is supplied as a feed (feed means) to the gasifier (Fig 1, items 12 and 10; p 2, pars 18-21). The wood can be dried using flue gases, therefore, a bark drying unit adapted to use waste heat from the mill for drying is implicitly disclosed or, at least, would have been obvious to one of ordinary skill in the art. A feed means and outlet means for the bark drying unit would similarly have been obvious, as would connecting the outlet means to the feed means for the gasifier. Saviharju et al also disclose a purifier attached to the gas outlet of the gasifier and a gas outlet from the purifier connected to a superheating boiler and to a lime kiln (Fig 1, items 44 and 46). Since using the gas from the gasifier in the soda recovery boiler would also have been obvious, as discussed above, connecting the gas outlet of the gasifier to a feed means of the recovery boiler for continuously supplying fuel gas would also have been obvious.

Kuusio et al do disclose an example of a soda recovery boiler and two soda recovery boiler-superheating boiler combinations in a pulp mill. The bled steam pressure is 12 bars and that of the low pressure steam is 4.5 bars, which the Examiner

construes as being typical steam pressures for bled steam and back pressure steam available in a pulp mill (p 14, line 34 to p 15, line 5).

O'Hagan et al disclose a fluidized bed dryer for particulate wet wood material or waste (i.e.-bark, wood chips, forest residues) using flue gases typically having a temperature of 400-600°F (204-315°C), and that the flue gases are cooled in the dryer to 160-250°F (71-121°C), which lies within the claimed ranges (Abs, col 1, lines 13-17; col. 6, lines 34-50; col 7, lines 36-38). Overheating of the wood is to be avoided (col 6, lines 17-18). O'Hagan et al also disclose that typically hog fuel or wet wood waste is dried to a 10-30% moisture content (col 5, lines 57-61). O'Hagan et al disclose that either steam or flue gas from a combustion source can be used for fluidizing and drying (Abs; col 1,lines 55-59; col 5, line 57 to col 6, line 1; col 7, lines 36-38). Using the drying gas to fluidize the bed inherently involves direct contact of the gas with the solids.

The art of Saviharju et al, Kuusio et al, Rundstrom, Shaw et al, Tomlinsion II, O'Hagan et al and the instant invention is analogous as pertaining to drying and gasifying waste wood. O'Hagan et al teaches that fluid or fluidized bed dryers are well known for the high rate of heat transfer between the gas and the fluidized particles as well as between bed particulates and surfaces immersed in the bed (col. 3, lines 18-21). It would have been obvious to a person of ordinary skill in the art to use a fluidized bed dryer as the drying apparatus in the process of Saviharju et al in view of Kuusio et al and further in view of O'Hagan et al to obtain a high rate of heat transfer and rapid drying of the bark. It would have further been obvious to one of ordinary skill in the art to obtain the claimed gas temperatures to avoid overheating the wood. Saviharju et al

discloses recovery of energy in the form of low pressure steam, which is available for other plant needs and Kuusio et al discloses low pressure steam and bled steam having pressures in the claimed range. It would have been obvious to one of ordinary skill in the art to use available low pressure or bled steam having the claimed pressure as a readily available source of energy for drying. It would also have been obvious to dry the wood waste to 10-30% as disclosed by O'Hagan to provide a suitable fuel for the gasification process.

Regarding Claims 20 and 23-25, although the cited references do not expressly disclose two separate dryers, duplication of parts has no patentable significance unless a new and unexpected result is produced (see MPEP 2144.04 VI B). There is no evidence in the instant Specification of unexpected results obtained by using two dryers in the process. It would have been obvious to make each dryer of the same type (i.e.- fluidized bed dryer) and connect one to the other.

Alternatively, the dryer of O'Hagan et al is constructed to provide a plurality of sequential drying zones. The dried fines are removed from each zone before the partially dried coarser particles are transported to the next zone, thus providing a more consistent moisture content in both fine and coarse particles. The gas flow velocity in each zone is varied to provide the optimum amount of drying (col 4, line 50 to col 5, line 9; col 5, lines 26-56). It would have been obvious to one of ordinary skill in the art to provide the drying in separate dryers in the process of Saviharju et al in view of Kuusio et al and Rundstrom and further in view of O'Hagan et al as a functionally equivalent option. The number of dryers required would have been determinable by one of

ordinary skill in the art. It would have been obvious to make each dryer of the same type (i.e.-fluidized bed dryer). Connecting the outlet of one dryer to the feed unit of the next would also have been obvious.

Regarding Claims 21-22, Rundstrom discloses grinding the wood pieces to sizes between about ½" to 8" is preferable for continuous operation of the gasifier (col 8, lines 25-30). It would thus have been obvious to include a grinding step before or between two dryers to obtain wood pieces of sizes between about ½" to 8" for continuous operation of the gasifier.

Claims 16 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saviharju et al in view of Kuusio et al and Rundstrom and further in view of Shaw et al, Tomlinsion II, as applied to Claims 1 and 9 above, and even further in view of Labedev-Krassin (RU-2011940, Derwent Abstract enclosed) or Watchman (4644136).

Saviharju et al ,Kuusio et al, Rundstrom, Shaw et al and Tomlinsion II do not disclose using warm water present at the pulp mill for drying the bark.

Labedev-Krassin discloses a dryer comprising drying chambers, the temperature of which is controlled by circulating warm water through heating/cooling coils in the chambers (Abs).

Watchman discloses a towel warmer that contacts the exposed surfaces of a towel with a continuous flow of warm air heated by hot water flowing through a conduit (Abs). Evaporation of any moisture in the towels (drying) would have been an obvious effect of the heating.

The art of Saviharju et al, Kuusio et al, Rundstrom, Shaw et al, Tomlinsion II, Labedev-Krassin, Watchman and the instant invention is analogous as pertaining to heating and drying materials. It would have been obvious to a person of ordinary skill in the art to use warm water available at the mill to provide energy for drying the bark in the process of Saviharju et al in view of Kuusio et al and Rundstrom and further in view of Shaw et al, Tomlinsion II and even further in view of Labedev-Krassin or Watchman as a readily available source of heat that minimizes the need for steam or heating fuels for the process.

Claim 43 is rejected under 35 U.S.C. 103(a) as being unpatentable over Saviharju et al in view of Kuusio et al and Rundstrom and further in view of Shaw et al, Tomlinsion II and O'Hagan et al, as applied to Claims 19 above, and even further in view of Labedev-Krassin (RU-2011940, Derwent Abstract enclosed) or Watchman (4644136).

The disclosures of Saviharju et al, Kuusio et al, Rundstrom, Shaw et al, Tomlinsion II, O'Hagan, Labedev-Krassin and Watchman are used as above.

Saviharju et al ,Kuusio et al, Rundstrom, Shaw et al, Tomlinsion II and O'Hagan do not disclose using warm water present at the pulp mill for drying the bark.

The art of Saviharju et al, Kuusio et al, Rundstrom, Shaw et al, Tomlinsion II, O'Hagan, Labedev-Krassin, Watchman and the instant invention is analogous as pertaining to heating and drying materials. It would have been obvious to a person of ordinary skill in the art to use warm water available at the mill to provide energy for

drying the bark in the process of Saviharju et al in view of Kuusio et al and Rundstrom and further in view of Shaw et al, Tomlinsion II and O'Hagan et al and even further in view of Labedev-Krassin or Watchman as a readily available source of heat that minimizes the need for steam or heating fuels for the process.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DENNIS CORDRAY whose telephone number is (571)272-8244. The examiner can normally be reached on M - F, 7:30 -4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Griffin can be reached on 571-272-1189. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Dennis Cordray/
Examiner, Art Unit 1791

/Steven P. Griffin/
Supervisory Patent Examiner, Art Unit 1791